

ABSTRACT

The present invention comprises the formation of photonic polymer-blend structures having tunable optical and mechanical properties. The photonic polymer-blend structures comprise monomer units of spherical microparticles of a polymer-blend material wherein the spherical microparticles have surfaces partially merged with one another in a robust inter-particle bond having a tunable inter-particle separation or bond length sequentially attached in a desired and programmable architecture. The photonic polymer-blend structures of the present invention can be linked by several hundred individual particles sequentially linked to form complex three-dimensional structures or highly ordered two-dimensional arrays of 3D columns with 2D spacing.